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Equipment for storage and transport of living fish.

The present invention concerns primarily a device for storage and transport of living fish, where the device is sausage-formed and the transport is preferably performed by 5 this being towed after a boat.

The harvesting of the sea in the form of fishing is the largest and oldest business in this country through history. Today the fish export, disregarding the petrol area, is Norway's largest business money-wise, and the 10 assurance of deliveries of products of high quality is of decisive importance for it to remain a large industry also in the future.

There are dumped large quantities of fish because the capacity of transporting it ashore is not present, and it 15 is also not of the proper quality.

There are several factors interacting to determine the quality of the fish and the fish products when they arrive at the consumers somewhere in the world. When the fish die, a process starts in the fish meat giving it a poorer 20 quality. The quality of the fish meat arriving at the consumer may be improved by waiting for the longest possible time before killing the fish so that the degradation process has been going on for as short a time as possible. The further treatment of the fish in the form 25 of processing, refining, storage and transport should be made as short as possible under the most suitable conditions to maintain the quality.

The delaying of the time for the sacrificing of the fish and thus the starting of the decaying process, is a method 30 that has been used in many connections also in former times through history. In seasons with e.g. a good supply of sails and perhaps a lack of capacity in the receiving country, the containment of fish in enclosures has been

common. This is done by the fish caught alive being imprisoned in a netting bag being anchored until it is fetched and is hoisted into a supply ship or the netting bag is towed to a receiving plant for fish. Fish that are 5 imprisoned in such an enclosure will be standing very cramped under perhaps poor current conditions, and this stresses the fish, something that again reduces the quality and the fish die.

There are used well supply ships for transporting the fish 10 from the netting enclosures. The well supply ships are equipped with tanks into which there is pumped seawater and wherein fish are kept during their transport and reception. Well supply ships is an expensive solution when considering that in many instances a lot of fish die in the netting 15 enclosures before the ships collect them, so the economical result of the fish may not be worthwhile in many cases.

In Norwegian patent no. 20.850 there is disclosed a storage unit for live fish comprising floats in both ends and between these a netting-cage for storing fish. Such a 20 solution is suitable for storing fish, is more expensive than required, and does not represent any good solution with respect to transport. The transport of fish in any such device will have its limitation in how fast it may be transported for the fish to survive, and this is not any 25 economically suitable speed for the transport per se.

Norwegian patent no. 81.500 discloses a container for collecting fish from a trawl and for further transport of the collected live fish to a receiving plant and for shorter storage. The collector is tied to a trawling bag 30 and is not regarded as any suitable way to store and transport fish with respect to maintaining quality and avoid fish death.

In addition to the transporting of fish in a more or less hydrodynamic device, fish are transported in netting bags,

a keeping netting. The towed keeping netting may not exceed a speed of 2-3 knots, something that is very time-consuming. Such solutions are disclosed in Norwegian patents nos. 24.069 and 52.761. The former discloses a seine bag being kept extended by a floating body, and a boat pulls the entire device. A speed exceeding 2-3 knots will be stressing for the fish and will create conditions increasing the mortality. In no. 52.761 there is disclosed a somewhat similar device, but here it is emphasised that there exist devices in addition to the seine netting which keep this inflated to avoid it being crushed during transport.

A container for transporting live fish, which also includes a penetrating current of water, appears from Norwegian patent no. 105.955. A penetrating current which may be reduced by one end partly comprising a solid grating or by one end being funnel-shaped. This to reduce the towing resistance and prevent the death of fish.

The purpose of the present invention is to provide a device being suited for storage and transport of live fish for transport velocities far exceeding (10-20 knots) what the fish would endure outside the device, but without it disparaging the environment. The invention has as one of its goals a price so that is will be competitive in view of what exist of transport devices for live fish.

This is achieved by a fish netting being secured in both ends with netting rings, and where at least one end is equipped with one netting and a funnel with a pursing mechanism.

Further details of the invention will be apparent from the disclosure infra of an exemplary embodiment thereof under reference to the figures.

Figure 1 depicts a basic form of the invention.

Figure 2 depicts a connection between several units into larger bags.

5 Figure 3 depicts connective devices for several units into larger bags.

Figure 4 depicts a detailed view of the outer enclosure according to the invention.

Figure 5 depicts the invention equipped with a brace and an anchoring of the bag.

10 Figure 6 depicts the fish bag during the transport with an additional external netting.

The invention comprises a fish bag 1 being made of strong webbing. If extra strength is wanted during e.g. transport, it is possible to sheath the entire fish bag 1 in a first netting 2. See figure 6. The fish bag 1 is tubular and is equipped with a bag ring 3 at both ends somewhat inside the end to keep the tube extended. To the ends of the fish bag 1 there is located a tubular second netting 4. At the transition between the fish bag 1 and the second netting 4, there is located a first purse line 5. A second purse line 6 is located in the second end of the second netting 4. Through these purse lines 5,6 the fish bag 1 may be pursed and be closed at the end so that fish do not escape, but it will be possible to determine and regulate the through-flow of water in the fish bag 1. This is depicted in the figures 1 and 4.

Several fish bags 1 may be connected into larger units as indicated in figure 2. The connection is performed by the bag rings 3 from fish bags 1 being placed adjacent to one another and being interconnected through a locking ring 7. See figure 3. In the connection there will thus be present such funnel-shaped units, one from each fish bag 1. When the fish bag 1,1' is to be towed behind a boat, extra towing lines 8 between the boat and the bag ring 3 may be applied.

During transport of fish in the fish bag 1,1' the first
purse line 5 is closed and the second purse line 6 is
completely closed so that flow-through of water is made
suitably rapid and comfortable for the fish. The fish bag
5 1 may be transported at great speed to its destination
without the fish becoming injured or dead.

By employing the present invention fish may be towed ashore
and may be stored live until the reception obtains the
required capacity or until the market offers the required
10 price. Furthermore, the fish may be towed alive as close
as possible to the relevant market prior to it being
slaughtered.

According to reports from the Ministry of Fishery a larger
number of receptacles for fish along the coast will be
15 closed within a short time. This means a longer transport
for delivery of fish and a larger need for transport of the
fish alive for maintaining its quality.

When maintaining the fish bag 1,1' in the sea for live
storage of the fish, there may along the fish bag 1,1' be
20 located braces 9 in the form of e.g. pipes. See figure 5.
These may also function as a scaffolding for persons caring
for the fish. The fish bag 1 may be equipped with current
providers in the form of motorised propellers to obtain the
required through-flow of water when the fish bag 1 is
25 stationary, e.g. in the capacity of a fish farming plant.